

REMARKS

The Office Action includes several rejections, each of which will be discussed in turn. As explained further below, claims 1-18 are pending in this application.

Support for the Amendment:

Claims 1 and 13 have been amended to further characterize the feed stream as an aqueous feed stream. No new matter has been added. Support for the amendment can be found throughout the specification and particularly at page 5, lines 27-28 and 31-32. Entry of the amendment is requested.

Replacement PCT Claim Set:

It appears that the Office Action mailed September 23, 2008 relies upon an incorrect claim set. This application claims priority to PCT Application No. PCT/US03/40646. In the PCT application, claims 1-20 were originally submitted and published in WO 2004/057255. However, the claims were later replaced while the application was still in the international phase. The PCT subsequently issued an *International Preliminary Examination Report* on November 17, 2004 with replacement claims 1-18 included in the Annex. At the time of filing this patent application, the filing papers make reference to 18 claims, thereby indicating that replacement claims 1-18 were intended to be examined for this application. The current Office Action, mailed September 23, 2008, includes rejections based on original PCT claims 1-20 and not replacement claims 1-18. This Amendment & Response includes the correct claim set in the *Listing of Claims* section along with the above stated amendments. Additionally, a review of the PAIR database revealed that one of the pages of the *International Preliminary Examination Report* is missing. For the Examiner's reference, a complete *International Preliminary Examination Report* is included with this Response.

Double Patenting Rejection:

Claims 1-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-12 of copending Application No. 11/247,949. This rejection is traversed. This rejection is based on original claims 1-20 of the PCT application rather than

replacement PCT claims 1-18. The Examiner is asked to reconsider the appropriateness of the rejection upon reviewing the correct claim set.

Claim Rejections under 35 U.S.C. § 112:

Claims 11-19 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. This rejection is traversed. This rejection is based on original claims 1-20 of the PCT application rather than replacement PCT claims 1-18 which are identified in the *Listing of Claims* section of this Response. Replacement PCT claims 1-18 fully resolve the assertions of indefiniteness under 35 USC §112 presented in the outstanding Office Action. As such, withdrawal of the rejections is requested.

Rejections over US Patent 6,438,867 to Teich et al.:

Claims 1-7, 9, 10, 11-14 and 20 are rejected under 35 U.S.C. § 102(b or e) as being anticipated by Teich et al. (U.S. Patent 6,438,867). This rejection is traversed, as explained below.

Independent claim 1 is directed to a process for drying solids in an aqueous feed stream that are initially wet with water by combining the feed stream with a first solvent and a second solvent. Claim 1 specifies that the first solvent has a heat of vaporization lower than the heat of vaporization of water and is soluble with water. Claim 1 also specifies that the second solvent has a heat of vaporization lower than that of the first solvent and is miscible in the first solvent.

Independent claim 13 is directed to a process for drying solids in an aqueous feed stream whose interstitial spaces are initially wet with water and ethanol wherein ethanol (a first solvent) is used to displace the water in the solids and either ether or n-propyl bromide (a second solvent) is used to displace the ethanol in the solids. Claim 13 further specifies that the ether or n-propyl bromide is removed by the application of heat.

Teich et al. are directed to preparing hydrogels (e.g., silica hydrogels) in a moving bed and countercurrent application. See Teich et al. at column 1, lines 5-27, and column 3, lines 43-67. There are numerous references throughout Teich et al. that refer to the use of a "drying fluid" or a "drying liquid" for drying microporous particles. For example, Teich et al. refer to

using water as a drying fluid at column 4, lines 25-26. Teich et al. also disclose the use of a water miscible drying liquid, such as an alcohol, wherein the water is either wholly or partially exchanged for the water miscible drying liquid. See column 4, lines 28-34. A number of other suitable drying liquids are listed at column 4, lines 46-63.

Claim 1 is neither anticipated nor rendered obvious by Teich et al. based upon at least the following reasoning.

First, Teich et al., fail to teach or suggest a process in which a first and second solvent are combined with an aqueous feed stream comprising solids having interstitial spaces wherein the solids have water present in interstitial spaces, as specified in claim 1. As disclosed in the specification for this application, the process of the present disclosure will effectively dry solids in an aqueous feed stream where the feed stream comprises as little as 5% solids by weight with the remaining 95% of the feed stream being water. See page 5, line 31 to page 6, line 1. The present application also discloses numerous other examples, such as the process described at pages 24-31 of the specification, that demonstrate the effectiveness of the disclosed process for drying solids in aqueous feed streams having a variety of water concentrations by weight that far exceed that of the solids in the feed stream. In contrast, Teich et al. teach the use of a moving bed and countercurrent where the solids are resting on the moving bed. For example, see column 6, lines 18-20 and column 7, lines 20-21. In a moving bed application, solvent would be applied, typically sprayed, onto the particles as the particles pass by on the moving bed. Significantly, Teich et al. teach that it is undesirable to have the solids in a fluid feed stream. Specifically, Teich et al. state that the "water stream or solvent stream is preferably adjusted so that there is no fluidization and hence no undesired separation in the moving bed." See column 6, lines 26-38. Further, there is no characterization of drying the interstitial spaces between the solids in Teich et al., but rather only the drying of microporous structures. As such, there is no teaching or suggestion in Teich et al. of combining an aqueous feed stream having solids initially wet with water with a first and second solvent to dry the interstitial spaces of solids, as specified in claim 1.

Second, Teich et al., fail to disclose a process in which two solvents are utilized to dry solids that are initially wet with water. Rather, Teich et al. disclose the use of a single solvent, such as an alcohol, for drying. The Office Action appears to rely upon column 7, lines 25-30, for

the assertion that two solvents are used to dry the pore liquid in the particles of Teich et al. While column 7, lines 25-30 of Teich et al. disclose the use of two liquids, only one of the liquids is actually characterized by Teich et al. as being a “fluid suitable for drying.” The other liquid, which is used to initially displace the pore liquid, is actually characterized by Teich et al. as being “miscible with the pore liquid, but not suitable for drying.” Because the initial displacing liquid is not suitable for drying, it cannot be properly characterized as either of the solvents specified in claim 1. For this same reason, it is not proper to characterize Teich et al. as contemplating the use of more than one of the drying fluids or liquids identified at various locations within column 4 of Teich et al. in a drying process. Therefore, Teich et al. provide no teaching or suggestion of a process in which two solvents are utilized to dry solids that are initially wet with water in the manner specified in claim 1.

Third, Teich et al., fail to teach or suggest a process for drying solids initially wet with water with a first solvent and a second solvent wherein the first solvent is miscible in water and has a lower heat of vaporization than that of water and wherein the second solvent is miscible in the first solvent and has a lower heat of vaporization than that of the first solvent. As related previously, Teich et al. only teach a process wherein a single solvent is utilized. Where Teich et al. discuss the use of two liquids, only one is characterized as being suitable for drying. Further, Teich et al. is completely silent as to the heat of vaporization of the fluid not suitable for drying as compared to either the pore liquid or the liquid that is suitable for drying. Clearly, Teich et al. do not teach or suggest the displacement of water with solvents having progressively lower heats of vaporization or the miscibility requirements specified in claim 1.

For at least the aforementioned reasons, Teich et al. neither anticipate nor render obvious claim 1, as specified. Because claims 2-12 depend from claim 1, they are patentable for at least the same reasons stated in support of claim 1.

Independent claim 13 is also neither anticipated nor rendered obvious by Teich et al. for at least the same reasons already stated in support of claim 1. As stated previously, independent claim 13 is directed to a process for drying solids in an aqueous feed stream whose interstitial spaces are initially wet with water and ethanol wherein ethanol and either ether or n-propyl bromide are used as the two solvents. Claim 13 further specifies that the ether or n-propyl bromide is removed by the application of heat. In contrast, Teich et al. teach the use of a single

solvent to dry microporous particles that are not in an aqueous feed stream. Further, Teich et al. do not teach a drying process wherein the solids are initially wet with both water and ethanol. Lastly, Teich et al. fail to disclose the use of heat to remove either ether or n-propyl bromide. Therefore, Teich et al. can neither anticipate nor render obvious claim 13 for at least the aforementioned reasons and those already presented in support of claim 1. Because claims 14-18 depend from claim 13, they are patentable for at least the same reasons.

Rejections over Teich et al., in view of US Patent 7,053,036 to DeGroot et al., US Patent 6,743,300 to Gray and US Patent 6,017,505 to Ziegler et al.:

In the Office Action, claim 8, 11-12 and 15-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Teich et al., in view of DeGroot et al., Gray and Ziegler et al. Additionally, claims 13-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Teich et al., in view of Ziegler et al. and Gray. These rejections are traversed, as explained below.

Claims 1-18 are not obvious over Teich et al., Degroot et al., Gray and Ziegler et al. because Degroot et al., Gray and Ziegler et al. fail to resolve any of the stated shortcomings cited in Teich et al., as explained below.

Ziegler et al. describe solvents at, for example, column 4, line 36 through column 5, line 5. Although Ziegler et al. use the phrase "and mixtures thereof" in reference to listed solvents at column 4, line 42, Ziegler et al. fail to disclose or suggest the use of a first solvent and a second solvent according to either claim 1 or 13. Specifically, Ziegler et al. fail to disclose or suggest a first solvent having a heat of vaporization lower than the heat of vaporization of water and being soluble with water, and a second solvent having a heat of vaporization lower than the heat of vaporization of the first solvent and being miscible with the first solvent.

With respect to DeGroot et al., the passages cited in the Office Action only refer to the use of a solvent mixture of n-propyl bromide and 1,1,1,3,3-pentafluorobutane for cleaning oil-contaminated substrates and for use as a deposition fluid. As such, DeGroot et al. fail to disclose the use of a first solvent and a second solvent for drying solids in a feed stream according to either claim 1 or 13.

Gray also teaches the use of n-propyl bromide, but not in the context of drying solids in a feed stream in accordance with claims 1 or 13. Rather, Gray teaches the use of solvents to treat materials placed in a cleaning chamber. As such Gray provides no teaching or suggestion of the use of a first solvent and a second solvent for drying solids in a feed stream according to either claim 1 or 13.

To summarize, Teich et al., Ziegler et al., DeGroot et al. and Gray each fail to teach or suggest the use of a first solvent having a heat of vaporization lower than the heat of vaporization of water and soluble with water, and a second solvent having a heat of vaporization lower than the heat of vaporization of the first solvent and being miscible with the first solvent. As importantly, none of the aforementioned references teach or suggest a drying process for solids that are present in an aqueous feed stream. It is therefore submitted that this characterization of the first solvent and the second solvent provides for a special combination so that the first solvent (that is miscible in water) can displace the water, and then the second solvent can displace the first solvent. Furthermore, because the second solvent has a heat of vaporization lower than the heat of vaporization of the first solvent, it takes less energy to remove the second solvent from the solid.

For at least the aforementioned reasons, claims 1-18 are not obvious over a combination of Teich et al., Degroot et al., Gray and Ziegler et al. Withdrawal of the rejections is requested.


In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance.



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Respectfully submitted,

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